Impact of the Data Packet Size on Performance
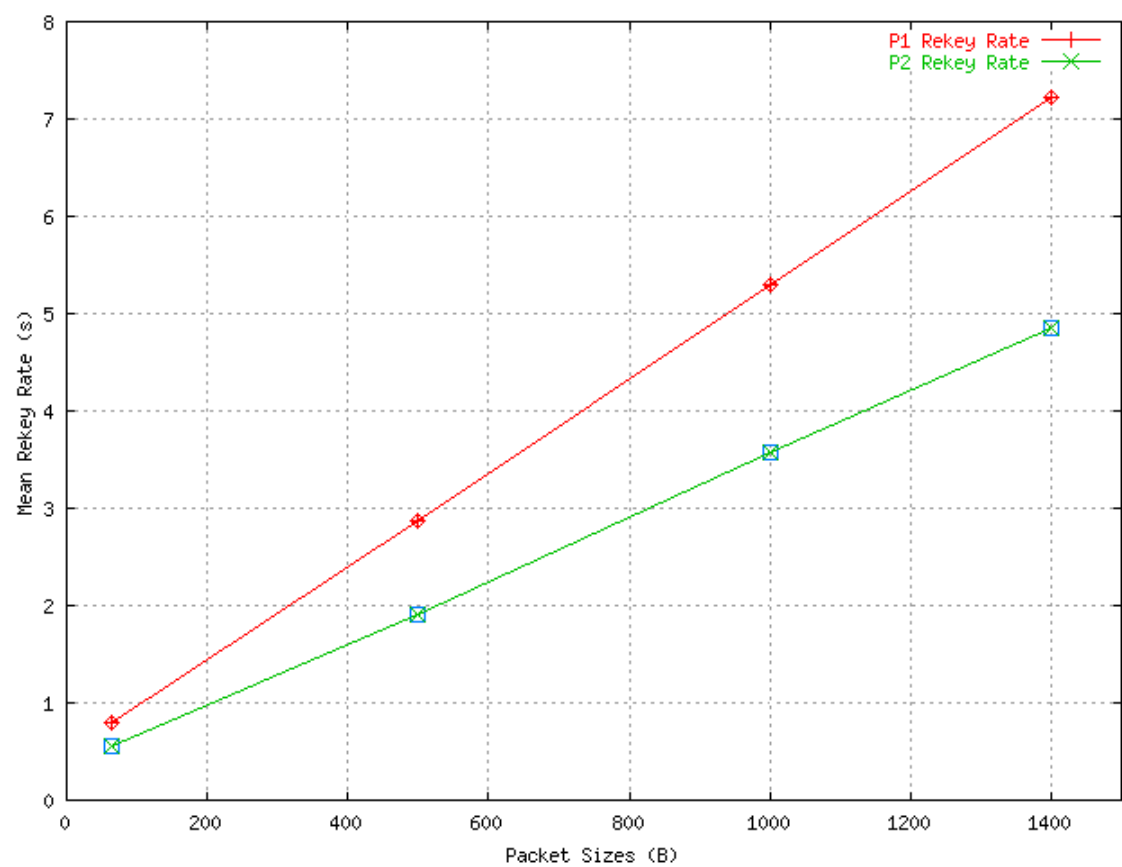

Figure 1: SA Re-Keying Latency with Various Packet Sizes

	64B	500B	1000B	1400B
Application:				
# of sessions(10MB/ses)	1470	2826	3006	3068
Avg Thrput (kbps)	68.999	133.299	141.894	144.91
Avg sess.delay (s)	1159.439	600.153	563.802	552.068
# of retransmissions	10	10	13	11
IKE: Initiator				
rekeying Sas	204	203	203	203
rekeying delay (s)	0.79	2.862	5.297	7.22
IPSec: Initiator				
rekeying requests	5144	5121	5100	5079
rekeying SA delay (s)	0.559	1.908	3.567	1.856
pkts dropped (no SAs)	10	10	10	10

Table 1: Performance Data with Various Packet Size

Analysis

As shown in Figure 1 and Table 1, SA re-keying latency for both phase 1
and phase 2 increases dramatically as the size of data packet
increases.

However, as the packet size increases so does the TCP application
performances such as session throughput and session delay. In other
words, smaller packets tend to degrade application performance. Due to
more data packets and ESP/AH overhead for those packets over IP
tunneling, it tends to need a little more time for the cryptographic
processing for the IP header during a TCP session with smaller packets,
resulting in the degraded performance.

For all the cases, initial SYN segments from the FTP clients (e.g., 10
TCP clients) seem to be dropped at the gateway due to no SAs and
retransmitted by the application clients. A number of retransmission
of a FIN message is also sent for the packet sizes of both 1000bytes
and 1400bytes.